

**TEMPERATURE EFFECTS ON THE PREVALENCE
OF MALE AND FEMALE DROSOPHILA
MELANOGASTER MEIGEN¹**

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INTRODUCTION

Interest in the correlation between climatology and the occurrence of different species of *Drosophila* has been increasing during the past decade. However, most of the emphasis has been on systematics. An incredible number of *Drosophila* have been collected and classified, but the precise weather conditions at the time of collecting have often been only roughly estimated, if noted at all. In this study the emphasis was placed on the temperature at the time of collecting.

MATERIALS AND METHODS

This study was begun in September of 1949 and continued until

TABLE I

The collection data for *Drosophila melanogaster*.

Temperature in degrees Fahrenheit	Total number of <i>melanogasters</i>	Per cent of total which are males	Per cent of total which are females	Number of collections	Average no. of <i>melanogasters</i> per collection	Number of paper cup type traps
50-60	1523	65.2	34.8	12	126.9	4
60-70	1876	61.1	38.9	10	187.6	4
70-80	3955	51.0	49.0	15	263.3	4
80-90	4882	31.5	68.5	14	348.7	4

September of 1950. The paper cup type of traps were employed throughout. The size of the cups were $3\frac{3}{4}'' \times 3''$. Bananas and

¹The author wishes to acknowledge his indebtedness to Dr. David D. Perkins of the Stanford University, Department of Biological Sciences for his constructive criticism and financial aid in this study.

yeast were used for bait. Traps with fresh bait were exchanged for the old traps every seven days. In this manner the condition of the bait was maintained quite constant, and the error due to the hatching of eggs in the food is eliminated. The funnel and jar type collector as described by Williams and Miller (3) was used to collect from the traps.

The traps were hung in wooded areas where the sun rays could not strike them directly. Temperature readings were recorded

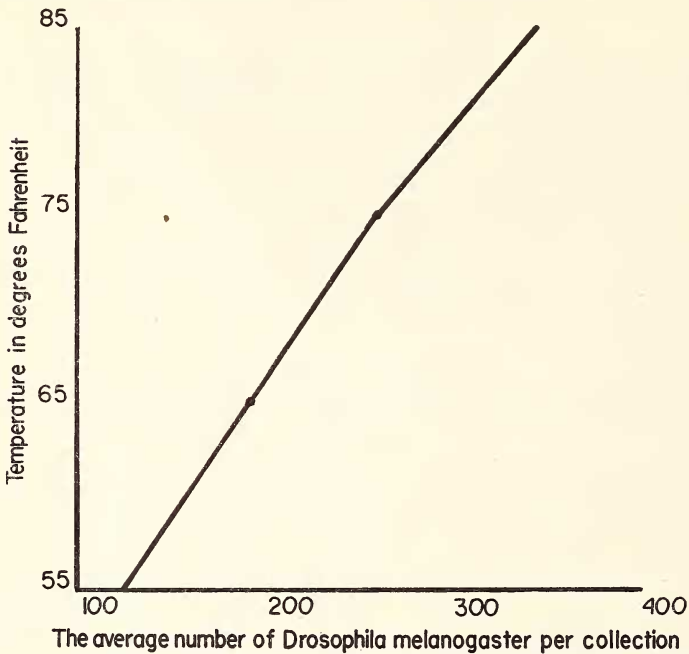


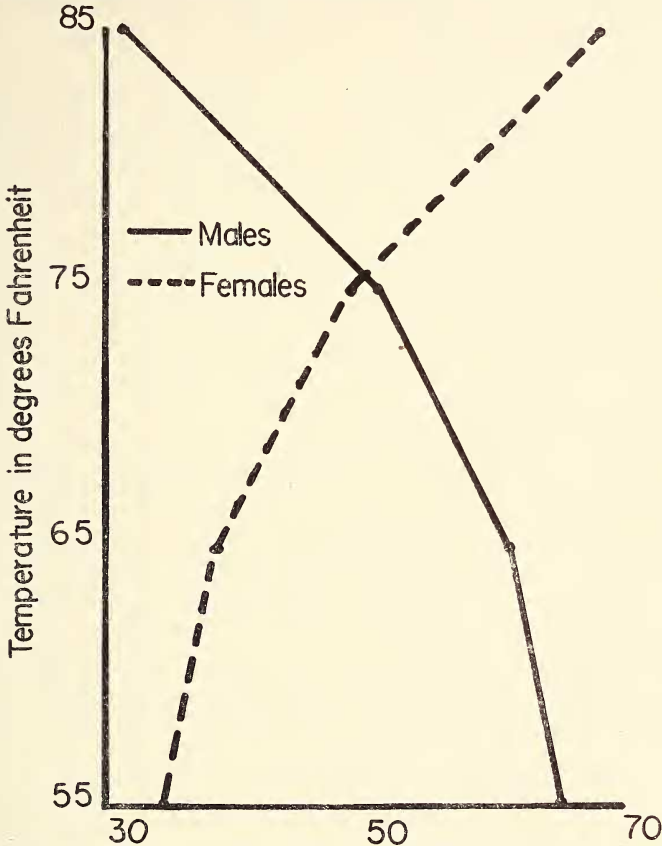
FIG. 1. This graph demonstrates that the prevalence of *Drosophila melanogaster* increases as the temperature increases.

at the site of the traps at the time of collecting. The specimens were etherized in the laboratory and identified as to species and sex.

FLUCTUATIONS OF THE MALE AND FEMALE POPULATION OF *Drosophila melanogaster*

After analysis of many collection records over a long period of time and over a great diversity of temperature changes in differ-

ent parts of the Southwest, Patterson (1) came to the conclusion that *Drosophila melanogaster* was predominant over *Drosophila simulans* in the colder seasons or regions, whereas *simulans* was predominant in the warmer seasons or regions. Thus *melano-*



Per cent *Drosophila melanogaster* males and females

FIG. 2. This graph demonstrates that the percentage of *Drosophila melanogaster* females increases as the temperature increases.

gaster attained its population peak in the spring and *simulans* in the late summer or fall when the temperature was at its highest.

Williams and Miller (3) reported that *Drosophila melanogaster* reached its population peak in September when the temperature was at its highest. *Drosophila simulans* also attained its popula-

tion peak in September, but at no time was *simulans* so numerous as *melanogaster*.

Spiess (2) also found that *melanogaster* reached its highest population peak in September, although the temperature was considerably higher in August. *Drosophila simulans* likewise attained its population peak in September, and its peak was higher than that for *melanogaster*.

In the present study *Drosophila melanogaster* appeared first in July and reached its population peak in the warmest month, September. The collection data for *melanogaster* are given in Table I. Figure 1 illustrates the increase in prevalence of *melanogaster* with temperature increases.

When collections were first begun for this study, it was noted that *Drosophila melanogaster* males were more numerous than the *melanogaster* females at a cooler temperature, but with a rise in temperature, the females increased greatly in numbers until they were predominant over the males. This relationship is illustrated graphically in Figure 2.

Other species of *Drosophila* collected during this study are *pseudoobscura*, *melanopalpa*, *hamatofila*, *immigrans*, and *busckii*.

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